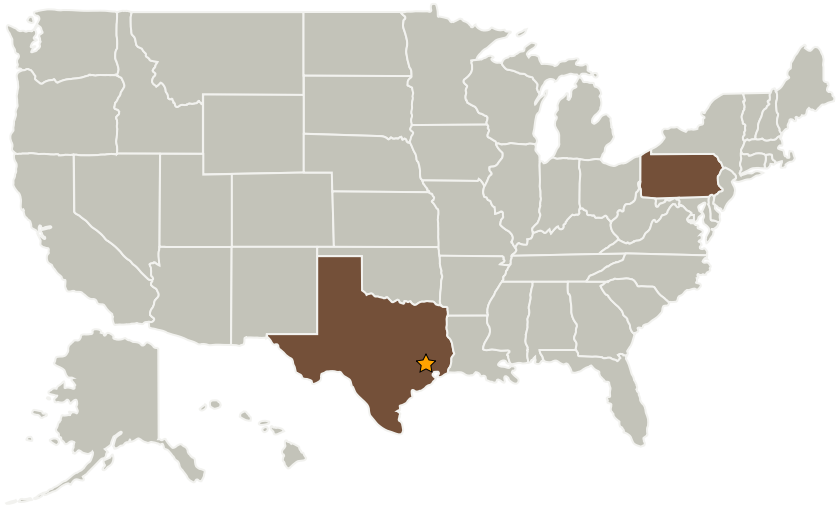
VCHP Radiators for Lunar and Martian Environments, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

Long-term Lunar and Martian systems present challenges to thermal control systems, including changes in thermal load, and large changes in the thermal environment between Lunar (or Martian) day and night. The Lunar thermal environment typically includes long periods in extremely cold thermal environments. A variable conductance heat pipe (VCHP) radiator will be developed that passively accommodates the changing thermal load and environment. In a VCHP, a non-condensable gas is added that blocks a portion of the condenser. The gas charge blocks more of the condenser as the heat pipe evaporator temperature changes. This allows the heat pipe evaporators (and any attached heat exchanger) to remain at an almost constant temperature. In addition to passively controlling the thermal load, the gas allows the fluid in the heat pipe to freeze in a controlled fashion as the heat pipe is shut down, avoiding damage. In addition, the gas in the VCHP will help with start-up from a frozen condition.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Advanced Cooling Technologies, Inc.	Supporting Organization	Industry	Lancaster, Pennsylvania

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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Pennsylvania	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

William R Anderson

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.2 Heat Transport